

Application No.: 10/572,602
Attorney Docket No.: 062271
Response Under 37 C.F.R. § 1.111

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

1-9. (Cancelled).

10. (Currently Amended): A liquid crystal display in IPS mode, wherein [[the]] an optical film according to claim 1 is arranged on a cell substrate on a viewing side,

a polarizing plate comprising a transparent protective film laminated on both sides of a polarizer is arranged on a cell substrate opposite to the viewing side, and an extraordinary refractive index direction of a liquid crystalline substance in a liquid crystal cell and an absorption axis of the polarizing plate are parallel, in a state where voltage is not applied,

wherein the optical film is a laminate in which plural retardation films are laminated on one side of a polarizing plate obtained by laminating a transparent protective film on both sides of a polarizer so that a retardation film (a) and a retardation film (b) are laminated in this order from the polarizing plate side so that the slow axes of the plural retardation films are parallel to one another and the absorption axis of the polarizing plate is parallel to the slow axes of the two retardation films,

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an Nz value expressed by $Nz = (nx_1 - nz_1) / (nx_1 - ny_1)$ is in the range of from 0.72 to 0.78 for the retardation film (a) and in the range of from 0.22 to 0.28 for retardation film (b), and
an in-plane retardation Re_1 expressed by $Re_1 = (nx_1 - ny_1) \times d_1$ is in the range of from 200 to 350 nm,

where in each of the plural retardation films, a direction along with the refractive index in the film plane is maximum is defined as the X-axis, a direction perpendicular to the X-axis as the Y-axis, the thickness direction of the film as the Z-axis, and where refractive indices in each axial direction are defined as nx_1 , ny_1 , and nz_1 , respectively, and the thickness of the film as d_1 (nm),

wherein

the transparent protective film laminated on at least one side of the polarizing plate comprises a thermoplastic resin (A) having a substituted and/or non-substituted imide group in a side chain and a thermoplastic resin (B) having substituted and/or non-substituted phenyl group, and nitrile group in a side chain; and

wherein

an in-plane retardation expressed by $Re_2 = (nx_2 - ny_2) \times d_2$ is 20 nm or less, and
a thickness direction retardation expressed by $Rth = \{(nx_2 + ny_2) / 2 - nz_2\} \times d_2$ is 30 nm or less,

where in the transparent protective film laminated on at least one side of the polarizing plate, a direction along with the refractive index in the film plane is maximum is defined as the X-axis, a direction perpendicular to the X-axis as the Y-axis, the thickness direction of the film

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as the Z-axis, and where refractive indices in each axial direction are defined as nx_2 , ny_2 , and nz_2 , respectively, and the thickness of the film as d_2 (nm),

and wherein the optical film is arranged so that the retardation films are laminated on the liquid crystal cell-side of the polarizing plate.

11. (Currently Amended): A liquid crystal display in IPS mode, wherein a polarizing plate comprising a transparent protective film laminated on both sides of a polarizer is arranged on a cell substrate on a viewing side, ~~the an~~ optical film ~~according to claim 1~~ is arranged on a cell substrate opposite to the viewing side, and

an extraordinary refractive index direction of a liquid crystalline substance in a liquid crystal cell and an absorption axis of the optical film are perpendicular, in a state where voltage is not applied,

wherein the optical film is a laminate in which plural retardation films are laminated on one side of a polarizing plate obtained by laminating a transparent protective film on both sides of a polarizer so that a retardation film (a) and a retardation film (b) are laminated in this order from the polarizing plate side so that the slow axes of the plural retardation films are parallel to one another and the absorption axis of the polarizing plate is parallel to the slow axes of the two retardation films,

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an Nz value expressed by $Nz = (nx_1 - nz_1) / (nx_1 - ny_1)$ is in the range of from 0.72 to 0.78 for the retardation film (a) and in the range of from 0.22 to 0.28 for retardation film (b), and
an in-plane retardation Re_1 expressed by $Re_1 = (nx_1 - ny_1) \times d_1$ is in the range of from 200 to 350 nm,

where in each of the plural retardation films, a direction along with the refractive index in the film plane is maximum is defined as the X-axis, a direction perpendicular to the X-axis as the Y-axis, the thickness direction of the film as the Z-axis, and where refractive indices in each axial direction are defined as nx_1 , ny_1 , and nz_1 , respectively, and the thickness of the film as d_1 (nm),

wherein

the transparent protective film laminated on at least one side of the polarizing plate comprises a thermoplastic resin (A) having a substituted and/or non-substituted imide group in a side chain and a thermoplastic resin (B) having substituted and/or non-substituted phenyl group, and nitrile group in a side chain; and

wherein

an in-plane retardation expressed by $Re_2 = (nx_2 - ny_2) \times d_2$ is 20 nm or less, and
a thickness direction retardation expressed by $Rth = \{(nx_2 + ny_2) / 2 - nz_2\} \times d_2$ is 30 nm or less,

where in the transparent protective film laminated on at least one side of the polarizing plate, a direction along with the refractive index in the film plane is maximum is defined as the X-axis, a direction perpendicular to the X-axis as the Y-axis, the thickness direction of the film

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as the Z-axis, and where refractive indices in each axial direction are defined as nx_2 , ny_2 , and nz_2 , respectively, and the thickness of the film as d_2 (nm),
and wherein the optical film is arranged so that the retardation films are laminated on the
liquid crystal cell-side of the polarizing plate.

12. (Previously Presented): The liquid crystal display according to Claim 10, wherein the transparent protective film laminated on at least one side of the polarizing plate comprises a thermoplastic resin (A) having a substituted and/or non-substituted imide group in a side chain and a thermoplastic resin (B) having a substituted and/or non-substituted phenyl group, and a nitrile group in a side chain.

13. (Previously Presented): The liquid crystal display according to claim 10, wherein an in-plane retardation expressed by $Re_2 = (nx_2 - ny_2) \times d_2$ is 20 nm or less, and a thickness direction retardation expressed by $Rth = \{(nx_2 + ny_2) / 2 - nz_2\} \times d_2$ is 30 nm or less,

where in the transparent protective film laminated on at least one side of the polarizing plate, a direction along with the refractive index in the film plane is maximum is defined as the X-axis, a direction perpendicular to the X-axis as the Y-axis, the thickness direction of the film as the Z-axis, and where refractive indices in each axial direction are defined as nx_2 , ny_2 , and nz_2 , respectively, and the thickness of the film as d_2 (nm).

14. (Previously Presented): The liquid crystal display according to claim 10, wherein the transparent protective film is a film that is treated by stretching process.

15. (Cancelled).

16. (Previously Presented): The liquid crystal display according to Claim 11, wherein the transparent protective film laminated on at least one side of the polarizing plate comprises a thermoplastic resin (A) having a substituted and/or non-substituted imide group in a side chain and a thermoplastic resin (B) having a substituted and/or non-substituted phenyl group, and a nitrile group in a side chain.

17. (Previously Presented): The liquid crystal display according to Claim 11, wherein an in-plane retardation expressed by $Re_2 = (nx_2 - ny_2) \times d_2$ is 20 nm or less, and a thickness direction retardation expressed by $Rth = \{(nx_2 + ny_2) / 2 - nz_2\} \times d_2$ is 30 nm or less,

where in the transparent protective film laminated on at least one side of the polarizing plate, a direction along with the refractive index in the film plane is maximum is defined as the X-axis, a direction perpendicular to the X-axis as the Y-axis, the thickness direction of the film as the Z-axis, and where refractive indices in each axial direction are defined as nx_2 , ny_2 , and nz_2 ,

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respectively, and the thickness of the film as d_2 (nm).

18. (Previously Presented): The liquid crystal display according to Claim 11, wherein the transparent protective film is a film that is treated by stretching process.

19-20. (Cancelled).

21. (Previously Presented): The liquid crystal display according to Claim 10, wherein, in the optical film, the absolute value of a difference in Nz value between the retardation film (a) and the retardation film (b) is in the range of from 0.4 to 0.6.

22-24. (Cancelled).

25. (Previously Presented): The liquid crystal display according to Claim 10, wherein, in the optical film, the transparent protective film is a film that is treated by stretching process.

26-28. (Cancelled).

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29. (Previously Presented): The liquid crystal display according to Claim 11, wherein, in the optical film, the absolute value of a difference in Nz value between the retardation film (a) and the retardation film (b) is in the range of from 0.4 to 0.6.

30-32. (Cancelled).

33. (Previously Presented): The liquid crystal display according to Claim 11, wherein, in the optical film, the transparent protective film is a film that is treated by stretching process.

34. (Cancelled).

35. (New): A liquid crystal display in IPS mode,
wherein an optical film is arranged on a cell substrate on a viewing side,
a polarizing plate comprising a transparent protective film laminated on both sides of a polarizer is arranged on a cell substrate opposite to the viewing side, and
an extraordinary refractive index direction of a liquid crystalline substance in a liquid crystal cell and an absorption axis of the polarizing plate are parallel, in a state where voltage is not applied,
wherein the optical film is a laminate in which the plural retardation films are laminated on one side of the polarizing plate obtained by laminating a transparent protective film on both

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sides of a polarizer so that a retardation film (b) and a retardation film (a) are laminated in this order from the polarizing plate side so that the slow axes of the plural retardation films are parallel to one another and the absorption axis of the polarizing plate is perpendicular to the slow axes of the two retardation films,

wherein

an Nz value expressed by $Nz = (nx_1 - nz_1)/nx_1 - ny_1$ is in the range of from 0.72 to 0.78 for the retardation film (a) and in the range of from 0.22 to 0.28 for the retardation film (b) and an in-plane retardation Re_1 expressed by $Re_1 = (nx_1 - nz_1) \times d_1$ is in the range of from 200 to 350 nm,

where in each of the plural retardation films, a direction along with the refractive index in the film plane is maximum is defined as the X-axis, a direction perpendicular to the X-axis as the Y-axis, the thickness direction of the film as the Z-axis, and where refractive indices in each axial direction are defined as nx_1 , ny_1 , and nz_1 , respectively, and the thickness of the film as d_1 (nm),

wherein

the transparent protective film laminated on at least one side of the polarizing plate comprises a thermoplastic resin (A) having a substituted and/or non-substituted imide group in a side chain and a thermoplastic resin (B) having substituted and/or non-substituted phenyl group, and nitrile group in a side chain,

wherein

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an in-plane retardation expressed by $Re_2 = (nx_2 - ny_2) \times d_2$ is 20 nm or less,

and

a thickness direction retardation expressed by $Rth = \{(nx_2 + ny_2)/2 - nz_2\} \times d_2$ is 30 nm or less,

wherein the transparent protective film laminated on at least one side of the polarizing plate, a direction along with the refractive index in the film plane is maximum is defined as the X-axis, a direction perpendicular to the X-axis as the Y-axis, the thickness direction of the film as the Z-axis, and wherein refractive indices in each axial direction are defined as nx_2 , ny_2 , and nz_2 , respectively, and the thickness of the film as d_2 (nm),

and wherein the optical film is arranged so that the retardation films are laminated on the liquid crystal cell-side of the polarizing plate.

36. (New): The liquid crystal display according to Claim 35, wherein the transparent protective film laminated on at least one side of the polarizing plate comprises a thermoplastic resin (A) having a substituted and/or non-substituted imide group in a side chain and a thermoplastic resin (B) having a substituted and/or non-substituted phenyl group, and a nitrile group in a side chain.

37. (New): The liquid crystal display according to claim 35, wherein

an in-plane retardation expressed by $Re_2 = (nx_2 - ny_2) \times d_2$ is 20 nm or less, and

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a thickness direction retardation expressed by $Rth = \{(nx_2 + ny_2) / 2 - nz_2\} \times d_2$ is 30 nm or less,

where in the transparent protective film laminated on at least one side of the polarizing plate, a direction along with the refractive index in the film plane is maximum is defined as the X-axis, a direction perpendicular to the X-axis as the Y-axis, the thickness direction of the film as the Z-axis, and where refractive indices in each axial direction are defined as nx_2 , ny_2 , and nz_2 , respectively, and the thickness of the film as d_2 (nm).

38. (New): The liquid crystal display according to claim 35, wherein the transparent protective film is a film that is treated by stretching process.

39. (New): The optical film according to claim 35, wherein the absolute value of a difference in Nz value between the retardation film (a) and the retardation film (b) is in the range of from 0.4 to 0.6.

40. (New): The optical film according to claim 35, wherein the transparent protective film is a film that is treated by stretching process.

41. (New): A liquid crystal display in IPS mode,
wherein a polarizing plate comprising a transparent protective film laminated on both

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sides of a polarizer is arranged on a cell substrate on a viewing side,
an optical film is arranged on a cell substrate opposite to the viewing side, and
an extraordinary refractive index direction of a liquid crystalline substance in a liquid
crystal cell and an absorption axis of the optical film are perpendicular, in a state where voltage is
not applied,

wherein the optical film is a laminate in which the plural retardation films are laminated
on one side of the polarizing plate obtained by laminating a transparent protective film on both
sides of a polarizer so that a retardation film (b) and a retardation film (a) are laminated in this
order from the polarizing plate side so that the slow axes of the plural retardation films are
parallel to one another and the absorption axis of the polarizing plate is perpendicular to the slow
axes of the two retardation films,

wherein

an Nz value expressed by $Nz = (nx_1 - nz_1)/(nx_1 - ny_1)$ is in the range of from 0.72 to 0.78
for the retardation film (a) and in the range of from 0.22 to 0.28 additional for the retardation
film (b) and

an in-plane retardation Re_1 expressed by $Re_1 = (nx_1 - ny_1) \times d_1$ is in the range of from 200
to 300 nm,

where in each of the plural retardation films, a direction along with the refractive index in
the film plane is maximum is defined as the X-axis, a direction perpendicular to the X-axis as the
Y-axis, the thickness direction of the film as the Z-axis, and where refractive indices in each

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axial direction are defined as nx_1 , ny_1 , and nz_1 , respectively, and the thickness of the film as d_1 (nm),

wherein

the transparent protective film laminated on at least one side of the polarizing plate comprises a thermoplastic resin (A) having a substituted and/or non-substituted imide group in a side chain and a thermoplastic resin (B) having substituted and/or non-substituted phenyl group, and nitrile group in a side chain,

wherein

an in-plane retardation expressed by $Re_2 = (nx_2 - ny_2) \times d_2$ is 20 nm or less,

and

a thickness direction retardation expressed by $Rth = \{(nx_2 + ny_2)/2 - nz_2\} \times d_2$ is 30 nm or less,

where in the transparent protective film laminated on at least one side of the polarizing plate, a direction along with the refractive index in the film plane is maximum is defined as the X-axis, a direction perpendicular to the X-axis as the Y-axis, the thickness direction of the film as the Z-axis, and where refractive indices in each axial direction are defined as nx_2 , ny_2 , and nz_2 , respectively, and the thickness of the film as d_2 (nm),

and wherein the optical film is arranged so that the retardation films are laminated on the liquid crystal cell-side of the polarizing plate.

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42. (New): The liquid crystal display according to claim 41, wherein the transparent protective film laminated on at least one side of the polarizing plate comprises a thermoplastic resin (A) having a substituted and/or non-substituted imide group in a side chain and a thermoplastic resin (B) having a substituted and/or non-substituted phenyl group, and a nitrile group in a side chain.

43. (New): The liquid crystal display according to claim 41, wherein an in-plane retardation expressed by $Re_2 = (nx_2 - ny_2) \times d_2$ is 20 nm or less, and a thickness direction retardation expressed by $Rth = \{(nx_2 + ny_2) / 2 - nz_2\} \times d_2$ is 30 nm or less,

where in the transparent protective film laminated on at least one side of the polarizing plate, a direction along with the refractive index in the film plane is maximum is defined as the X-axis, a direction perpendicular to the X-axis as the Y-axis, the thickness direction of the film as the Z-axis, and where refractive indices in each axial direction are defined as nx_2 , ny_2 , and nz_2 , respectively, and the thickness of the film as d_2 (nm).

44. (New): The liquid crystal display according to claim 41, wherein the transparent protective film is a film that is treated by stretching process.

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45. (New): The optical film according to claim 41, wherein the absolute value of a difference in Nz value between the retardation film (a) and the retardation film (b) is in the range of from 0.4 to 0.6.

46. (New): The optical film according to claim 41, wherein the transparent protective film is a film that is treated by stretching process.